



## Annual Report

*2019-2020 Academic Year*

Written by AIChE Projects Leadership  
August 2020

## | A Letter from the Director |

Dear Reader,

Thank you for opening the first AIChE Projects Annual Report! We (Projects Leadership) are very excited to bring it to you. Back in Spring Quarter 2020, Nick, Jared, and I, while updating old documents and preparing for the coming year, discovered that prior to our involvement in the org, AIChE Projects used to release biannual reports which highlighted individual team progress as well as successes, challenges, and direction for the Projects program as a whole. We loved the idea and have decided to launch a new Annual Report recapping the year for our teams and our organization, just as the Biannual Report did. This Annual Report is hopefully the first of many; we hope you enjoy it.

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The six Project Teams in AIChE Projects this year have all made significant progress, and one has excelled and changed so much that they have now graduated out of our program. This progress was made despite an extremely unusual and challenging end to the year for everyone, due to COVID-19's abrupt entrance and disruptions. Teams could no longer meet in-person, and build sessions all but ground to a halt, drastically changing how our program looked and functioned. The work that each team accomplished in light of the ongoing pandemic and prior to its onset is commendable. A more detailed description of their achievements is given later in this report, but I wanted to take a moment to highlight each team here. Fuel Cell built an electrolytic cell and researched ways to improve hydrogen storage by modifying their design, while Portable Wind Power finalized their 3D turbine models and dove into Arduino as a tool for their prototype's operation. Simultaneously, Active Water Treatment made strides with their tank, piping, and filtration system. Cryodesalination targeted their areas of focus, fundraised successfully, and conducted research and tests; meanwhile, Phosphorus Wastewater Treatment switched from using electrodialysis and precipitation reactions to ion transfer columns, and conducted tests to begin optimizing their process. Photonic Fabrics underwent major changes to their overarching goal, secured funding and mentorship, performed tests on their 3D printer parts, and transitioned out of Projects into a startup company.

This year also brought many improvements to the Projects program, including more resources for Project Managers (with PM-Leadership meetings and the PM Handbook), improved documentation regarding member requirements and procedures, and financial support to the teams via fundraising. Our communication system also

underwent changes this year, as Projects shifted to using Slack, created a YouTube channel, and built an enhanced website with more regular updates. This emphasis on improved online communication was partly as an adaptation to COVID-19 circumstances, but has ultimately proved to be a long-term benefit, allowing us to reach our members and a wider audience more effectively. In response to the pandemic, we also shifted our Spring events to be entirely virtual. The Python workshop was our first challenge, and showed us that online events can be as engaging and valuable as their in-person counterparts. The Spring Showcase and recruitment interviews were more difficult to host online, but after much planning and creative thinking, were productive and successful.

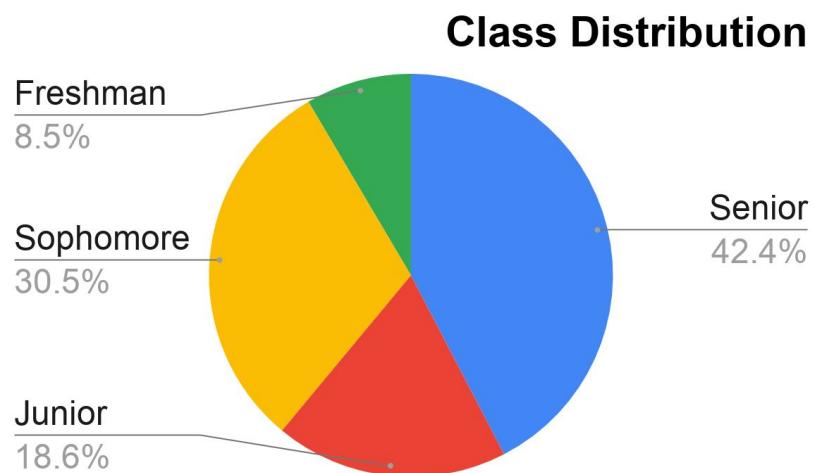
In the coming year, we are excited to continue improving the AIChE Projects program and supporting our teams in their endeavors. Our goal is to ensure that members are able to bring their projects closer to completion in creative ways, while following health and safety guidelines. We will also foster an environment conducive to team formation, and hope to welcome a new team into our program. And, though we won't be able to meet in-person for a while, we hope to increase the sense of community among all Projects members, and to encourage collaboration between teams.

Overall, we aim to continue and improve the legacy of this organization and maximize the talent, potential, and excitement of its members and teams. Thank you for coming on this journey with us.

Sincerely,  
Eleanor Quirk, AIChE Projects Program Director

A handwritten signature in black ink, appearing to read "Eleanor Q".

## | 2019-2020 AIChE Projects Statistics |



## Fundraising

\$400

TESC Funding

\$530

AIChE Fundraising

Funds are important to AIChE Projects, as they are used to purchase materials and equipment for the teams' research and testing endeavors.

Fun fact: this was the first year that AIChE Projects held fundraising events!



## Technical Workshops

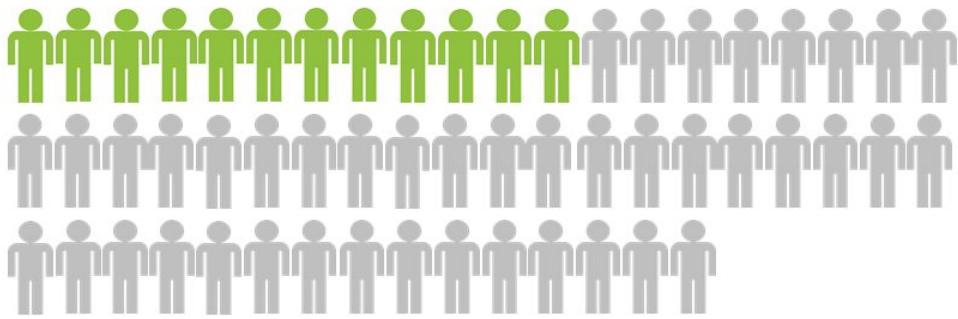
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Solidworks  
AutoCAD  
Python

## Recruitment Breakdown

### FALL

55 Applied / 12 Accepted



### SPRING

19 Applied / 16 Accepted

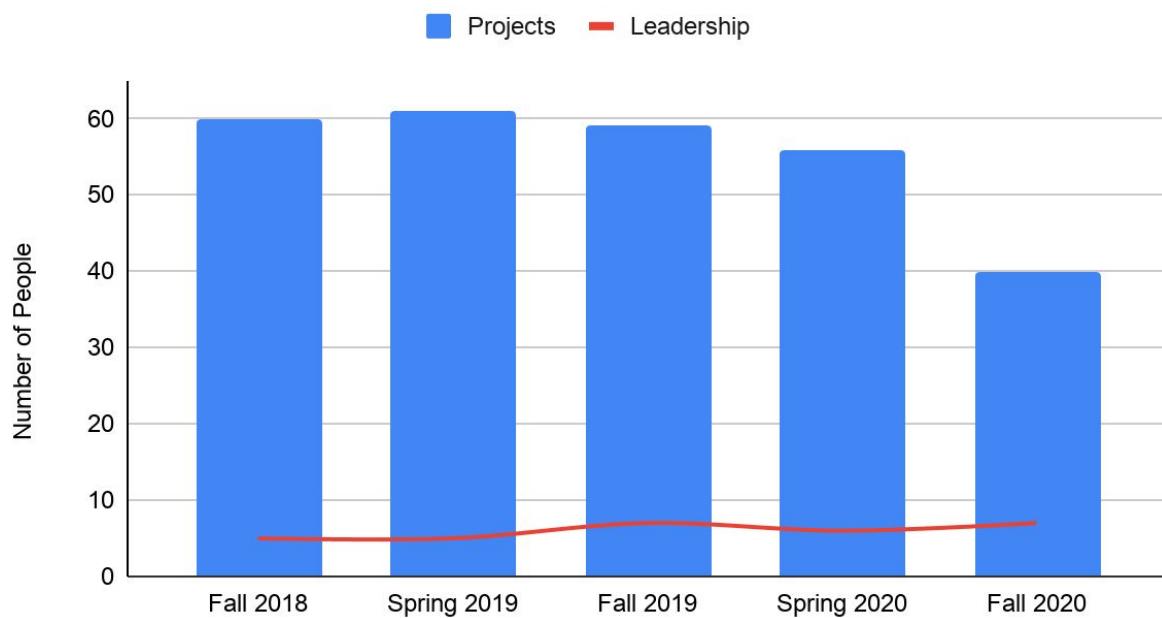


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Recruitment Events

Fall Welcome Night  
Spring Showcase

## Projects Membership Over Time



# | Project Teams and Their Progress |

## TIMELINE OF ACTIVE WATER TREATMENT'S PROGRESS

FALL 2019-SPRING 2020



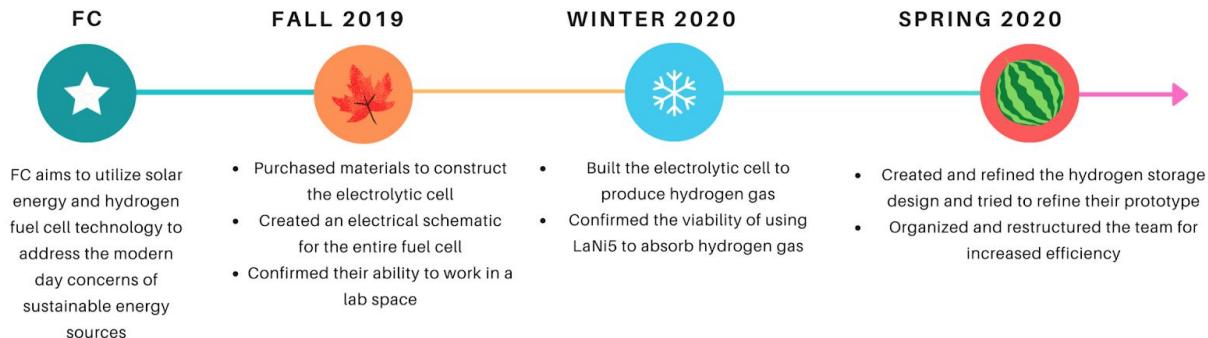
## TIMELINE OF CRYODE-SALINATION'S PROGRESS

FALL 2019-SPRING 2020



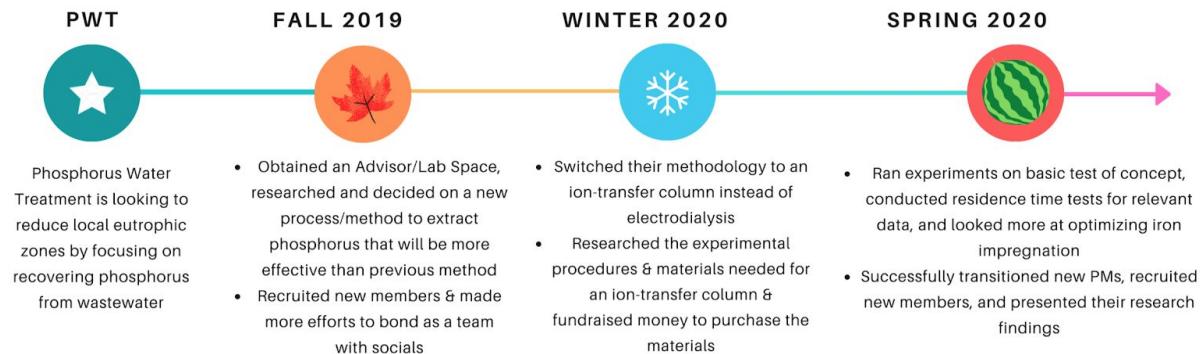
## TIMELINE OF FUEL CELL'S PROGRESS

FALL 2019-SPRING 2020



## TIMELINE OF PHOSPHORUS WATER TREATMENT'S PROGRESS

FALL 2019-SPRING 2020



## TIMELINE OF PHOTONIC FABRIC'S PROGRESS

FALL 2019-SPRING 2020



## TIMELINE OF PORTABLE WIND POWER'S PROGRESS

FALL 2019-SPRING 2020



# | Program Progress |

Leadership is constantly looking for ways to improve the Projects program, and this year was no exception. We are eager to introduce our newest advancements to you, and to bring them with us as we continue into another year of this program.

- ❖ **Project Manager and Leadership Alignment Meetings.** The first PM-Leadership Alignment Meeting took place in May of 2019. The goal of these meetings are to create a space for communication and knowledge-sharing among PMs and Leadership, and to ensure that everyone knows their responsibilities, as well as the resources that are available to them. These meetings give PMs a chance to make their voices heard regarding Projects policies and procedures, and helps Leadership understand what help specific teams might need. PM-Leadership Alignment Meetings have become a bi-annual event, happening in the spring and in the fall.
- ❖ **Adoption of Slack for primary communication.** Beginning in October 2019, Leadership began using Slack to communicate internally and with the PMs. Over the course of the year, Project Teams began to use Slack as well. As of this writing, four teams are using Slack. This platform centralizes all relevant information, categorizes discussion topics, and allows for past documents and channels to be archived for later use. By the end of Fall 2020, we hope to have all of the program's communications consolidated on this platform.
- ❖ **Recording strike systems.** Over the years, Projects had adopted several strike systems in various teams, but they were not present everywhere nor were they consistent. Throughout this year, Leadership standardized and formally documented the systems that keep all members accountable, from general members to those in leadership, ensuring that everyone in the program knows how to best forward AIChE Projects' mission. The strike systems are also a significant point in the first PM-Leadership Alignment Meeting, where PMs are welcome to provide constructive criticisms about them if they believe it necessary. All PMs are encouraged to share relevant strike systems with their teams, as well as ensure that the system is fair and justified.
- ❖ **Creating Standard Operating Procedures (SOPs).** Similar to the strike systems, this year saw a major clarification on a logistical matter. Procedures for actions such as beginning a new team, closing a team, adding members to teams,

and moving members from one team to another, have existed since Projects began, but have never been officially standardized and documented. This year's Leadership identified many of those actions and created documentation for how to do them in a clear and professional way. These documents have been posted where the PMs can find them, and will be visible to the public on our website soon.

- ❖ **A new website, and many website updates.** In Fall 2019, Projects switched from using Weebly to Wix, which is significantly easier to use (both in terms of managing site content and user interaction), and generally better-looking. The site ([aicheprojects.org](http://aicheprojects.org)) has become an increasingly important form of communication, especially with the onset of COVID-19. Projects' online events were recorded and posted on the website, and the site served as a hub for poster sessions and interviews during Spring Showcase and recruitment, respectively. Other updates to the site include a page celebrating teams that won awards in the Spring Showcase, new posters from each Project Team, changes to the Leadership team, an easier path to contact Leadership, and a place for people to share ideas for new teams. An increased online presence also prompted us to create a YouTube channel in conjunction with the rest of AIChE at UCSD.
- ❖ **Fundraisers.** This year, our usual source of funding did not provide us with as much financial support as we anticipated. To compensate, Leadership organized three fundraisers: a Jamba Juice gift card sale, a Tapioca Express fundraiser, and a Chipotle fundraiser. The first fundraiser was quite successful, earning a net \$500 in funding. The second was not insignificant, earning \$30. The Chipotle fundraiser was scheduled for the first week of Spring quarter, and was canceled due to complications and health concerns associated with the COVID-19 pandemic. This funding went to teams to be used for materials and equipment, as well as operating costs of the program.
- ❖ **Project Manager Handbook.** In Winter 2020, Leadership began to write a thorough document known as the PM Handbook. Its goal was to be a significant source of information for the PMs to reference as needed, empowering them to lead their teams with confidence. The handbook covers an array of topics, including financial options for Project Teams, organizational strategies for team meetings, the requirements for all members of Projects, the responsibilities of all Leadership members, and more. The handbook is updated and re-released regularly to provide the PMs with the most up-to-date and relevant information.

Many unexpected changes were made to the Projects program this year, due to the arrival of the COVID-19 pandemic in California at the end of Winter quarter. The pandemic impacted our program specifically by closing labs, halting in-person team meetings, and scattering Projects members across the globe. To respond to the ongoing crisis, we waived event requirements and moved our program to completely remote operation: all meetings, events, and interviews happened online. This change was difficult for the teams, many of whom were in the midst of build sessions. Their flexibility and perseverance throughout the pandemic is admirable. Several Projects members also joined a mask-making initiative, originally organized by Leadership. The team's goal was to produce masks for use by healthcare workers on the frontlines of the pandemic; 3D-printed masks were the focus of the group, with an adjacent interest in cotton masks. Several dozen masks were printed and sewn by this team.

At the time this report was written, UC San Diego is planning to provide a “hybrid” educational experience for its students, with some classes having in-person components while others are completely virtual. Recently, school officials made the decision to cancel in-person events hosted by student organizations. Projects will be continuing its remote operation until it is safe enough to meet in-person again.

Though we face another virtual quarter, we are excited to continue our regular events, as well as implement new initiatives for AIChE Projects.

# | 2019-2020 AIChE Projects |

## AIChE Projects Leadership 2019-2020 & 2020-2021



**Janessa Duque**  
*Projects Program Director*  
*2019-2020*



**Aaron Thomas Ramos**  
*Projects Program Manager*  
*2019-2020*



**Aku Saraf**  
*Projects Research Coordinator*  
*2019-2020*



**Eleanor Quirk**  
*Projects Program Director*  
*2020-2021*



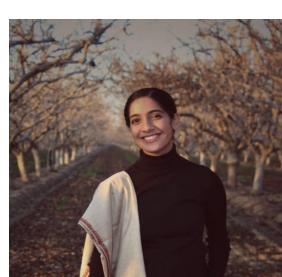
**Nick Dorn**  
*Projects Program Manager*  
*2020-2021*



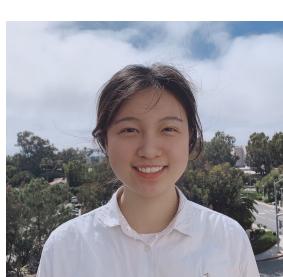
**Jared Ian Gadia**  
*Projects Research Coordinator*  
*2020-2021*



**Hridayanand Khemchandani**  
*Assistant Program Manager*  
*2020-2021*



**Harleen Mander**  
*Assistant Program Manager*  
*2020-2021*



**Yuntong (Joy) Zhou**  
*Assistant Research Coordinator*  
*2020-2021*



**Diana Vo**  
*Assistant Program Director*  
*2020-2021*



## **Project Teams** (*Italics indicate 2019-2020 Project Managers*)

- Active Water Treatment
  - ◆ *Aaron Thomas Ramos* '20
  - ◆ *Jane Vo* '20
  - ◆ *Jack Wang* '20
  - ◆ *Marianna Perez* '20
  - ◆ *David Yu Wei Lin* '20
  - ◆ *Rebecca Albers* '22
  - ◆ *Animesh Mohapatra* '22
  - ◆ *Brieger Keenan* '21
  - ◆ *Hailey Morris* '22
  - ◆ *Isabella Aruguay* '23
  - ◆ *Mireya Vivar* '23
  - ◆ *Yang Han* '22
- Cryodesalination
  - ◆ *Cathy Lao* '20
  - ◆ *Harlan Maass* '20
  - ◆ *Chelsie Ceballos* '20
  - ◆ *Errick-Michael Santos* '21
  - ◆ *Arun Chumber* '22
  - ◆ *Yumin Zhao* '20
  - ◆ *Kyle Bui* '22
  - ◆ *Altamish Shermohammed* '23
  - ◆ *Harleen Mander* '22
- Fuel Cell
  - ◆ *Susie Park* '20
  - ◆ *Bryan Thai* '20
  - ◆ *Daniel Kupor* '20
  - ◆ *Kevin Widjaja* '21
  - ◆ *Hannah Kim* '22
  - ◆ *Nick Dorn* '22
  - ◆ *Oswah Sarwar* '22
  - ◆ *Joyce Shen* '21
- Photonic Fabrics (Multi-Function Energy Harvesting FA19, Controlled System Temperature Regulation WI20)
  - ◆ *Tiffany Wang* '20
  - ◆ *Tatiana Podhajny* '21
  - ◆ *Aku Saraf* '20
  - ◆ *Jefferson Lei* '21
  - ◆ *Tanay Patil* '21
  - ◆ *Nam Nguyen* '21
  - ◆ *Arthur Miranda-Huicochea* '22
  - ◆ *Khoa Nguyen* '22
  - ◆ *Ruixiao Liu* '23
- Portable Wind Power
  - ◆ *Sophie Huang* '20
  - ◆ *Anthony Picchi* '21
  - ◆ *Kasey Leong* '20
  - ◆ *Caroline Hutnick* '20
  - ◆ *Brian Mora-Maciel* '22
  - ◆ *Janessa Duque* '20
  - ◆ *Daniel Lee* '20
  - ◆ *Michelle Singer* '22
  - ◆ *Henry Asker* '22
  - ◆ *Jacob Hohn* '20
- Phosphorus Water Treatment
  - ◆ *Michelle Nguyen* '20
  - ◆ *Ezequiel Ansaldi* '20
  - ◆ *Evan Santos* '20
  - ◆ *Arturo Medina* '20
  - ◆ *Nicholas Wan* '21
  - ◆ *Eleanor Quirk* '22
  - ◆ *Diana Vo* '22
  - ◆ *Brandon Huang* '20
  - ◆ *Yuntong (Joy) Zhou* '23

## Faculty Mentorship

Faculty mentorship has been a large part of our team's success over the years. Faculty mentors are able to provide technical know-how, experimental design tips, theoretical knowledge, and lab space for our teams. They are indispensable resources to both the individual teams and the organization as a whole. This year, AIChE Projects received counsel from 3 faculty mentors across our 5 teams. A photo and brief description of each faculty mentor is presented below.

*Zheng Chen*



Zheng Chen is an Assistant Professor in the Nanoengineering department of the Jacobs School of Engineering. His research primarily focuses on sustainable materials and energy, a field which several AIChE Projects teams are strongly associated with. He provided technical knowledge and lab space to the Active Water Treatment, Fuel Cell, and Phosphorous Water Treatment teams.

*Ping Liu*



Ping Liu is an Associate Professor in the Nanoengineering department of the Jacobs School of engineering. His research focuses on electrochemical material science. He provided theoretical and technical knowledge to the Cryodesalination team.

*Qiang Zhu*



Qiang Zhu is a professor in the Structural Engineering department of the Jacobs School of Engineering. His research explores fluid effects on structural systems. He was an invaluable resource for the Portable Wind Power team throughout the past year.

## **Thank you to the AIChE Executive Board**

- President - Tiffany Chen
- VP Internal - Michelle Singer
- VP External - Mahika Lunker
- VP Operations - Hannah Kim
- VP Finance - Soyoung Shin
- Publicity and Social Media Chair - Laura Matos
- Fundraising Chair - Oswah Sarwar
- Industry Chair - Tiffany Wang
- Department Chair - Emily McAdams
- Outreach Chair - Brieger Keenan
- Mentorship Chairs - Maha Nayak and Eleanor Quirk

**Thank you to our graduating leadership, Aku Saraf, Aaron Thomas Ramos, and Janessa Duque for everything you've done! We are forever indebted to your service and mentorship. You all are off to do great things, and we will always be cheering you on!**

**Thank you to the Triton Engineering Student Council, Jacobs School of Engineering, UCSD staff and faculty, and program advisor Justin Opatkiewicz.**

**Thank you to our Faculty mentors, Zheng Chen, Ping Liu, and Qiang Zhu!**

**From Leadership: thank you to all the members of AIChE Projects for your hard work and dedication to the program's mission.**

**And lastly, thank you to readers of this report, for staying connected to our organization and celebrating the successes of our various teams!**